

5 Digital storytelling for developing students' agency through the process of design: a case study

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1. Introduction

Today's use of technology and media in daily life has altered the dominant role the written word has played in communication over centuries. Currently, educational settings take into consideration the combination of different modes of representation that exist in an array of everyday texts. "Developing knowledge about linguistic, visual and digital meaning-making systems" (Unsworth, 2001, p. 10) has become a key learning objective. In the digital era, students develop literacy by understanding the organization and display of information through multiple modes of communication and the ways these different modes cooperate in the creation of meanings (Jewitt, 2009; Kress, 2009; Lemke, 1998; Unsworth, 2001). As a result, teaching through and about media is crucial in foreign language classrooms to promote transcultural and translingual competencies (Lebrun, Lacelle, & Boutin, 2012). Yet foreign language educators must learn how the *relationships* (Kern, 2006) or *orchestration* (Kress & van Leeuwen, 1996; Nelson, 2006) *within* and *across* semiotic modes (Kress, 2003), including language, facilitate the ways learners create meaning. Developing activities that teach students the tools of multimodal texts and how to reapply these resources in a personal way forces teachers to reflect upon ways their teaching practices facilitate language learning (Anderson, Chung, & Macleroy, 2018; Jiang, 2017; Ollivier, 2018).

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Conducted in an intermediate French-language curriculum grounded in the pedagogy of multiliteracies (New London Group, 1996), and Cope and Kalantzis's (2015) framework of learning by design, this study investigates Digital Storytelling (DS) (Lambert, 2002) within a social synesthetic semiosis (Nelson, 2006; Oskoz & Elola, 2016; Yang, 2012) with particular attention to the transformation and transduction processes (Bezemer & Jewitt, 2009; Kress, 2003). In other words, I explore how DS supports students' selection and orchestration of semiotics to construct layers of meaning and foster language development.

Findings from two case studies of fourth-semester French learners highlight participants' ability to circumvent challenges and convey their stories in multiple modes, including the target language. The study underscores to foreign language teachers the potential of media projects anchored in the multiliteracies framework to enhance students' media literacy skills as they critically reflect on the use of media from the perspective of both consumers and producers.

2. Background

2.1. Multiliteracies

These past decades, within the field of literacy studies, numerous educators and scholars (Cope & Kalantzis, 2009, 2015; Gee, 2008; Kern, 2000, 2015; Kress, 2003; New London Group, 1996) have stressed the changes occurring as a result of new social practices and discussed what it means to be literate in today's world. The concept of being literate has shifted from knowing how to read and write printed text to gaining the ability to read and produce varied texts across a set of social and cultural contexts through multiple digital devices. Today's texts are produced, distributed, and consumed through visual, aural, sensorial, spatial, and gestural modes which, when combined, communicate particular meanings, achieve specific purposes, and reach certain audiences. Thus, language – in its linguistic dimension – can no longer be considered

the sole mode of conveying messages. Foreign language educators should no longer privilege the linguistic mode at the expense of other modes. Instead, they should address these new literacies and new ways of creating meanings to help students navigate through and negotiate with multimodal texts and their meanings to become multiliterate.

According to [Lebrun et al. \(2012\)](#), the teaching of new literacies and multiliteracies is central in foreign language classrooms, and a few studies have demonstrated the significance of its implementation. Most instructors teach using multimodal texts rather than teaching how to read and write them. Because instructors lack knowledge of what makes a text multimodal, they privilege the linguistic mode over other semiotic resources. Thus, scholars promote the integration of teaching new literacies into language curricula and stress the importance of incorporating innovative pedagogical frameworks into teachers' professional development ([Anderson et al., 2018](#); [Ollivier, 2018](#); [Oskoz & Elola, 2016](#)).

Although the implementation of these frameworks is challenging and time-consuming, they allow teachers to reflect on their teaching practices. The concept of design ([Cope & Kalantzis, 2009, 2015](#); [Kern, 2015](#)) in the multiliteracies framework proposes developing a classroom application as an active process of transformation from the known to the new. Through acts of designing and redesigning, students build knowledge. Design elements included in text, image, sound, gesture, space, and sense allow students to move back and forth among the modes of representation and foster meaning-making. Such multimodal design provides interconnection across and between other modes, and learning emerges from mode switching. Students become more sensitive to the semiotics used in texts and their meaning potential. They gain the ability to make intentional choices while producing their own multimodal texts through a variety of means in the target language ([Jiang, 2017](#)).

Furthermore, the learning by design approach applies to both learners and teachers. The former take control of their apprenticeship to become designers of their knowledge through action-taking, collaboration, and active participation in

and outside formal learning (Anderson et al., 2018). The latter plan and organize teaching sequences around multimodal texts, identify learning strategies, and reflect on assessment and learning outcomes.

Moreover, instructors should experiment with innovative and collaborative approaches to fulfilling foreign language learners' needs and fostering learning competencies as a whole rather than in isolation (Anderson et al., 2018). Across scholarships, there emerge various implementations of experiential learning in foreign language education. These curricula have provided L2 learning and teaching approaches that fostered multiliteracies, such as the use of social media (Reinhardt & Zander, 2011), gaming (Reinhardt, Warner, & Lange, 2014), social reading (Blyth, 2014), and global simulation (Michelson & Dupuy, 2014).

2.2. DS and language learning

DS is a textual narrative embedded with other modes of communication (Alismail, 2015; Robin, 2006). It consists of “short, two to three-minute mini-films usually based on still photos brought into a multimedia format, with a textual narrative read with the narrator’s voice” (Lundby, 2008, p. 366). The multimodal dimension of a DS empowers digital storytellers who engage with multiple modes of representation that have an “exponentially more complex impact” on themselves and their audience (Lambert, 2013).

Many studies have examined the integration of digital stories in educational settings, but few studies have explored DS in Foreign Language (FL/L2) learning contexts. Studies have shown that DS, through formal and informal learning, have a beneficial impact on students’ cognition and language learning, as well as on their technology, media, and social competencies (Anderson et al., 2018; Burgess, 2006; Podkalicka & Campbell, 2010; Vinogradova, Linville, & Bickel, 2011). In developing their digital stories, students learn how to collect information, using technology, or search in the ‘real’ world (e.g. taking pictures, composing music or recording sounds, and interviewing members of a community). Through their production, students combine various modes (soundtrack, voiceovers, and images) and genres (interviews, documentaries,

and moving and still images). They develop coherent narratives in which they can express their emotions and values. In addition, they gain the ability to compose stories using technology and to collect and arrange textual, visual, and audio elements, as well as to perform orally (Anderson et al., 2018; Burgess, 2006; Jiang, 2017; Vinogradova et al., 2011).

Furthermore, the implementation of DS in FL/L2 classrooms involves using all language modalities: writing, reading, listening, and speaking. As they develop the composition of their story, language learners must make selective linguistic choices in terms of genre conventions, morpho-syntactic features (e.g. tenses, vocabulary, grammar), language register, and discourse appropriateness. As producers of digital stories, students need to learn how to write narratives following genre conventions and often with a limited number of words. According to Paulus (1999), the use of a multiple-draft approach is best for practicing writing in FL/L2 classrooms. Digital stories also support students' improvement in their speaking skills (Kim, 2014; Nelson, 2006). To perform the task of speaking, students have to practice pronunciation and work on their intonation. Studies on the use of online recording programs and self-assessment demonstrate significant improvement in speaking accuracy and communicative performance (Jiang, 2017; Lynch, 2007; Volle, 2005). In addition, the multimodal dimension of DS places students beyond the single act of learning how to read, write, and speak in an FL. It engages learners in viewing and showing, communicating through sounds and visuals, and combining resources to create meanings. In the same way that they make written or spoken choices, they must make choices around design elements including color, font, layouts, background, and transition effects. They have to envision their project, anticipate the audience's reaction, and manage the challenges presented by the creation of multimodal texts (Anderson et al., 2018; Castañeda, 2013; Jiang, 2017; Kern, 2006; Miller, 2009; Van Gils, 2005). DS allows students to learn how language "as one important dimension of semiosis among others" (Nelson & Kern, 2012, p. 61) is anchored in sociocultural contexts and interconnected with other modes of representation to produce meanings. It goes beyond the sole learning of lexico-grammatical features (e.g. syntactic structures, grammar rules, vocabulary lists).

3. Methodology

3.1. Course context and description

The study was conducted in two sections of a fourth-semester French course in which I implemented critical media literacy frameworks combined with Cope and Kalantzis's (2015) knowledge processes to foster language learning and emergent literacies. Throughout the semester, students explored topics through authentic texts culturally embedded in French society. For instance, students designed political cartoons addressing global issues after reflecting upon the controversial French magazine *Charlie Hebdo* and the role of cartoonists in the world. They also made promotional posters to advertise the National Museum of Immigration in Paris. They created informative posters to promote web safety among youth and their families. Finally, they produced their digital story. These projects occurred throughout the semester and allowed students to explore multiple media representations and various linguistic and semiotic forms of multimodal texts. Students engaged with these texts from the perspective of consumers and language learners and produced media artifacts drawing upon the concepts of ethics, audience, and ideology of the target culture.

Inspired by the Story Center's movement and mission to "create spaces for listening to and sharing stories" and to provide "skills and tools that support self-expression, creative practice and community building" (<https://www.storycenter.org/about>), I used the Center Story's steps into the curriculum to help students to develop their final project. Although tied to specific codes and conventions, DS offers creative writing and production, allowing students to apply and reflect on what they have learned during a course. Before creating their digital story, students explored one particular digital story that I carefully selected on the Story Center's website and discussed the relationships of the semiotics chosen by the author. Then, as homework, students chose two different digital stories and reflected on what they watched and the semiotic element(s) that captured their attention and could potentially be used in their project. I evaluated students' work at every step of the process, including French to respond to language

obstacles and learners' needs. I gave feedback on the written scripts and the pronunciation, intonation, and language flow of the voiceover. Before the final submission, students were able to verify and evaluate their projects according to a rubric used to assess the final version of the project.

3.2. Research questions

This article seeks to answer the following research question: in what ways does DS contribute to a student's understanding of how the selection and orchestration of semiotics constructs layers of meaning and impacts multiliteracy skills and language development?

3.3. Participants

I focused on two case studies of students who identified themselves as L2 French learners and were enrolled in an intermediate French class, the final course of the basic language sequence at the university. Criteria for selecting these students included their commitment to the class, their motivation in learning the target language and culture, and their high level of participation in class. By selecting these two case studies, I intended to present a contrastive sample of how students in the class had chosen to develop their digital story with specific semiotics in mind. These examples aim to illustrate possible learning strategies that students, consciously or unconsciously, implemented to achieve their projects.

Born in Mexico, Maïze (pseudonym) arrived in the United States with her family when she was seven years old. At the time of the study, she was 19 years old, a sophomore majoring in psychology and minoring in French. In a postsemester interview, Maïze tied her interest in French to her belief that learning a language expands creativity and cultural knowledge. As a native speaker of Spanish, she enjoyed comparing the differences of the languages. Raised within American culture with Hispanic traditions, she was often able to grasp the similarities between the French and the Mexican cultures and see how they differed from American culture.

Maïze's DS is entitled "Choses Oubliées [Forgotten Things]" and is intended to raise "a global controversy" that she described as follows. "Likes, hearts, followers and subscribers. Every day, these things fill up our thoughts; they intoxicate our beliefs and influence us to behave in a way that the rest of society expects and wants us to behave".

Fanny (pseudonym) is a 20-year-old American white woman who grew up in Houston, Texas. Her mother was American, and her father immigrated from England to the United States when he was 18 years old. Fanny was an only child who was born with a missing arm. Her parents raised her according to the belief that having one arm is incidental and should not be used as an excuse for not doing what others can. Fanny demonstrated a strong personality, always speaking for herself and standing up for her opinions. At the time of the study, Fanny was a freshman majoring in geology and physics in the College of Sciences. Before undertaking the French course, Fanny spent her last high school semester in France at a private bilingual international school, in Paris. Although disabled, Fanny was not registered at the university's Disability Resource Center and did not ask for any accommodations.

Fanny's DS is entitled "Ma vie". In her initial proposal, the tentative title of her story was "The One Arm Wonder", which she described as follows. "In 199[...], on August [...], I was born without my right arm. Being born this way has given me the beautiful opportunity to see life th[r]ough a unique perspective that has made me who I am today. I have learned valuable lessons that I wish to share with the world with the goal of teaching about perspective and the power of the individual".

For this study, I refer to data collected from these two stories as ways to best exemplify how DS impacts meaning-making, multiliteracies, and language development. In comparing and contrasting these two stories, disparities emerged in how the students selected and orchestrated the semiotic resources at their disposal. For instance, whereas Fanny, who felt that her technological skills were limited, presented her project as a PowerPoint slideshow, Maïze created a complex project that incorporated photos, videos, music, transitions, and effects.

Another difference between Fanny and Maïze lies in their choices of resources to tell their story. Fanny decided to tell her story by relying primarily on linguistic resources. In contrast, Maïze developed her project around the use of visuals and aesthetics, avoiding the overuse of linguistic features.

Furthermore, even though these case studies were selected as examples of students' processes of design, gaps exist in the data collection as a result of what participants gave access to in their consent forms. While Maïze agreed to provide a postsemester interview, Fanny did not. In addition, although consent forms were collected by a third party and given to me after the official release of final grades, participants were fully aware of the research agenda and knew that their work could be shown in an academic context. Thus, conflicts of interest may appear in a study where participants complete a classroom project that calls for personal statements.

Finally, in terms of audience, the students did not display their artifacts on a participative website. The tasks did not bring students beyond the educational boundaries and therefore, although fostering digital literacies, did not “involve real-world processes of language use” (Ollivier, 2018, p. 36).

The following analysis should be considered alongside these limitations.

3.4. Data collection

The data were collected from diverse sources: the DS steps described below and the students' final artifacts. In addition, Maïze's two postsemester interviews were analyzed.

Students developed their projects following six steps and used L1 except for Steps 4 and 5. Feedback was given for Steps 1, 3, 4, and 5.

1. Propose a story.
2. Complete a prequestionnaire to reflect on the design process.
3. Develop a storyboard.
4. Draft a narration.

5. Record a voiceover.
6. After submission, complete a postquestionnaire to reflect on learning outcomes.

3.5. Postsemester interviews

Maïze consented to give a postsemester interview in English. Her first interview was exceptionally long (44:39 min), and she agreed to give a second interview. The two interviews, conducted in person and recorded, took place in a university library study room. The first interview happened during the spring semester following the course, and the second occurred during the summer. The first interview was semistructured with direct questions about the critical media literacy framework and the creation of media artifacts. Less directive, the second interview focused on the artifact itself and the decisions made by the participant while designing it.

3.6. Data analysis

The study followed [Nelson \(2006\)](#) and [Bezemer and Jewitt's \(2009\)](#) analytical focus. The analysis identifies the modes of communication (e.g. verbal, visual, aural, gestural, spatial) and investigates the decisions made by the participants to construct meanings.

The qualitative data analysis of participants' artifacts involved two phases.

3.6.1. *Phase 1: analytic memos and initial coding*

Based on grounded theory ([Bryant & Charmaz, 2007](#)), the analysis of data started with written analytic memos followed by open coding. First, I recorded and reported the general patterns, categories, and subcategories of the data. Then, I used in vivo coding for participants' pre and postquestionnaires and Maïze's semistructured interviews. Interviews were transcribed in written form, and data were analyzed for new insights about the process of creation based on

the participants' goals. Finally, I compared storyboards, written drafts, and the final project version to investigate any significant differences.

3.6.2. Phase 2: multimodal arrangement

Scrutinizing the final artifacts and the arrangement of modes helped me to better understand participants' process of design while developing their digital stories. First, I quantitatively tabulated and coded the diverse modes of communication – textual, oral, aural, and visual – based on the purposes for using these modes. Then, I explored whether a specific mode was predominant or if the participants used modes evenly. Finally, I analyzed the disparities that emerged between and within the modes of representation.

4. Findings

The following section discusses how the two participants decided to select and use particular semiotics over others to convey meanings. Participants showed autonomy and personal learning strategies.

4.1. Textual mode

Fanny primarily concentrated her DS on her writing and decided to add captions to her PowerPoint slides to reach both the L2 and L1 audience. She demonstrated knowledge of narratology and used writing strategies to communicate her story. She had higher L2 proficiency than her peers and was committed to mastering the writing portions of her digital story by submitting multiple drafts (4) to receive as much feedback as possible.

Conversely, Maïze made little use of the textual mode in her DS. She only used it to state credits and acknowledgments, which were displayed at the end of the project. She did not want to use English captions to reach a broader audience and advocated in her interview:

“I think my message would reach more people if I also used the English language, but I also think sticking to the French language might intrigue more people and make them focus more on the actual video rather than the voiceover. ... I want [people] to watch the video, I don’t really care if they don’t understand, I want them to kind of see the feelings that they get when they watch it, just the video”.

For Maïze, the use of French could carry her message not by conveying meaning but by intriguing people. The audience’s inability to understand what she says strengthens other modes of communication. People could focus on visual and aural elements to negotiate meanings from the relationships of design elements. She wanted to awaken people’s feelings through creativity, and she had found written texts to be merely informational and not sufficiently aesthetic.

4.2. Oral/aural mode

A piece of music and a recorded voiceover represent the aural mode of Maïze’s project.

In her interviews, she explained that selecting music was difficult, and she had to change it twice. She avoided music with too fast or too slow a beat or lyrics that could distract her audience. She played one song throughout her project.

Her voiceover in French presents structured sentences to mitigate the language barrier. In the postquestionnaire, she wrote, “I didn’t think complex ideas could be expressed in another language. Especially if that language was choppy and not fully developed. But then, I found a way to voice those complex ideas in a simpler manner”. Maïze created short and concise sentences in L2 to deliver her message, and worked on her intonation to express rhythm, melody, and beat and emphasize the limited amount of words she used. She stated:

“The tone of voice is crucial. I’ve always been so focused on pronouncing words right that I never really noticed the tone I was pronouncing them

in. I don't think you always need words to express something when your tone of voice can say everything for you".

Fanny put in a lot of work in the voiceover to improve her speaking skills. In her postquestionnaire, she explained:

"The project helped me improve my speaking the most because I had to revisit my spoken portions numerous times. I feel that I spent about an even amount of time on making the auditory and visual components of the project, but I feel that I prepared the most for the auditory component".

In addition, she did not add any music to her final presentation. Instead, she wanted her audience to listen to the story, and "wake them up to their blessings, bring them to a humble state of being".

From the start of the project, she favored using both languages to fulfill her mission of becoming an inspiration for others. In her prequestionnaire, she explained, "I would like to have the whole project in French to improve my French but I am concerned about my subject becoming complex with tenses that I have not learned yet". Thus, Fanny focused her project on delivering her message rather than on improving her language proficiency or digital skills. Nonetheless, in her postquestionnaire, she confessed:

"I used the online tool that speaks text for you. I used this tool to help improve my speaking skills [which] was improved by the project because I had to repeat saying words out loud over and over until they sounded correct. I had to listen to the online tools that speak text repeatedly in order to improve my speaking accuracy".

Despite her main determination to share her message, Fanny decided to select a digital tool to work on her L2 oral skills, and as a result she learned how to use it on her own.

4.3. Visual mode

Both participants included visuals in their projects and used personal pictures to avoid any copyright issues. While Maïze spent a lot of time producing her visuals to make sure they would convey her story on their own, Fanny presented numerous pictures displayed in a collage form throughout her slideshow. These pictures were mostly used to illustrate her statements rather than to create specific meanings. Nonetheless, in an examination and comparison of the semiotics used by Fanny, some slides revealed disparities between the linguistics and the visuals. One slide in particular is analyzed more deeply in the second part of the findings section.

Maïze's entire project employed the visual mode. During an interview, Maïze explained, "I am a [sic] visual, so I really like the pictures, and like, the sounds or the subtitles kind of come second, so when I was working on it, I was try [sic] to, I just leave [sic] them out". Describing herself as a visually oriented person and a visual learner, she used images to share her message to others. For her project, she shot 14 different photos and 11 videos, and she explained: "I used my phone to take pictures and record most of the videos, two editing websites – Fotor.com and Ribbet.com – to edit the pictures so they would fit in the widescreen frame of the film, and Windows Movie Maker to bring it all together". In addition, she balanced still and moving images throughout the project by adding effects and transitions to maintain an aspect of fluidity.

These two participants made meaningful choices based on their digital skills and language confidence to deliver their stories. This underscores their determination to engage and play with design elements and shows autonomy and learning strategies.

The following section provides insights on how the participants arranged semiotics and 'translated' meanings in their digital stories, by using the concept of either transformation or transduction (Bezemer & Jewitt, 2009; Kress, 2003) as the design process.

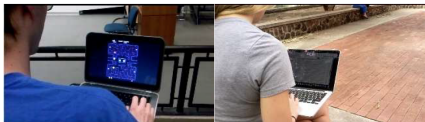
4.4. Orchestration of semiotics

The chains of semiosis give particular attention to (1) the concept of transformation, defined as the process of shifting elements within a mode, and (2) the concept of transduction, which is “a process where something configured or formed in one modality is reconfigured or reformed into a different modality” (Kress, 2003, p. 47).

4.4.1. Maïze’s case



The concept of transformation was particularly relevant when comparing Maïze’s storyboard with her final project. She provided detailed explanations about her use of design elements and a fully developed French narrative. Figure 1 presents a sample of Maïze’s storyboard. By capturing the visuals, she produced an original digital story and gave people “a sense of [her] own perspective, and what [she] believe[s] in”.

Figure 1. Maïze’s first slide of the storyboard

<p>Images (<i>general or specific, location if known</i>):</p>  <p>Design (<i>background color, font style, special effects</i>):</p> <p>(No title screen)</p> <p>Transition into video from black screen.</p> <p>Background image: Video of people on their computers.</p> <p>Audio (<i>music, sound effects</i>):</p> <p>Music: <u>Intro – The xx</u> (song starts)</p> <p>Narration (<i>the actual text that you would record to accompany this slide</i>):</p> <p>La technologie. Qu’est-ce c’est la technologie?</p>

Maïze took multiple steps to achieve her goal. First, she selected pictures she liked from Google images and reproduced them. Her principal concern about using Google images involved the fact that the images were not hers and she did not know about their original purpose. Using an image that looked similar to what she was trying to convey was not enough. She needed to capture her environment and give her perspective. In her second interview, she explained, “I did not want random people, but people with whom I interacted and talked to them, and asked them to act for me to portray my experience and show my view within my environment”. Inspired by images found online, Maïze reconfigured and rearranged her visuals. She staged scenes and made people act to “translate” her vision. Figure 2 presents one of the Google images selected by Maïze on the left², and the picture she recreated on the right. Her act of recontextualization and transformation within the same mode is incontestable. In setting the scene in her environment – the university – and in representing people who live around her in realistic outfits and attitudes, she showed ownership in the process of design.

Figure 2. Comparative table between the storyboard and the final project

Google Image (presented in storyboard)	Original Picture (drawn from Maïze’s DST)
	

Moreover, Maïze had a good sense of her storyline, and her storyboard provided fully structured sentences written in French. She produced short sentences and a redundant pattern to develop a melody and communicate her message. From the storyboard to the final version, the sentences did not change much and she only corrected lexico-grammatical mistakes based on feedback. Nonetheless, Maïze decided to stretch out some sentences across the slides. For instance, in

2. To the best of this researcher’s knowledge this image is copyright free.

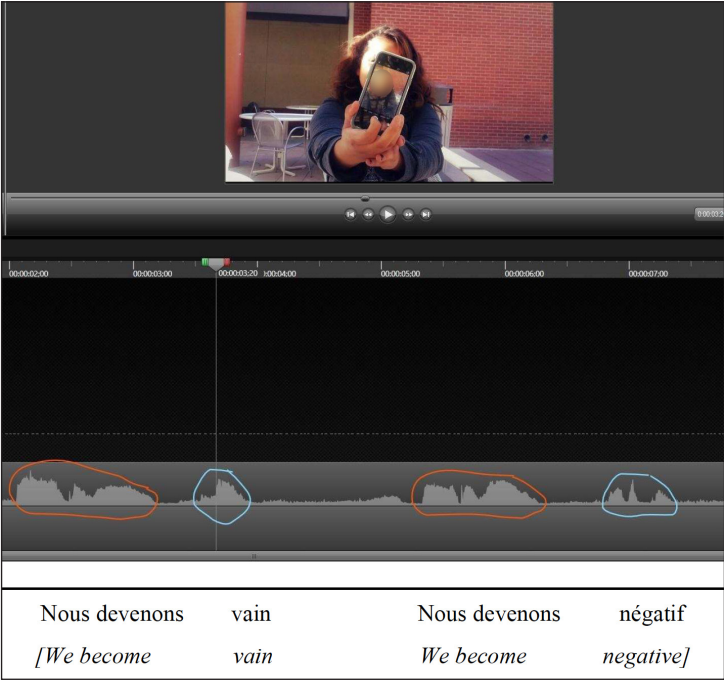
Table 1, the second sentence in bold of Slide 3 from the storyboard (Nous le/la vérifions à chaque minute) was stretched out to Slide 4 in the final version. The rationale for adding images and stretching out sentences was to provide connections between images and words. During an interview, Maïze explained, “I kind of had really good pictures that I wanted definitively put in there, and some good lines that I wanted to put in there”. Thus, Maïze had to stretch out sentences of the voiceover and played around with the aural and visual modes during the editing phase to finalize the project the way she envisioned it.

Table 1. Comparative table of narrative script and voiceover

Slides	Narration written in the storyboard over of the digital story	Slides	Narration transcribed from the voice
1	La technologie. Qu'est-ce que c'est la technologie?	1	La technologie, qu'est-ce que c'est la technologie?
2	Comment est-ce que nous l'utilisons?	2	Quand est-ce que nous l'utilisons?
3	Nous l'utilison [sic] tous les jours. Nous le vérifions chaque minute.	3	Nous l'utilisons tous les jours
		4	Nous la vérifions à chaque minute

Furthermore, Maïze emphasized her overall message within two or three modes of communication. For instance, one of Maïze's pictures represented “vanity”, and the words she wanted to emphasize in her narration were the two adjectives “vain” and “negative”. In order to highlight both words, she drastically accentuated her intonation when pronouncing them. Taken with TechSmith's software Camtasia, **Figure 3** represents the transduction of meanings produced by Maïze from one mode – visual – to another – oral. As shown, the sentence “nous devenons [we become]” is presented by the two encircled longest audio tracks, while the shortest ones represent the adjectives “vain [vain]” and “négatif [negative]”. The increase of the waveforms (encircled) shows the verbal/textual elements expressed by Maïze's voice. In contrast, the decrease in volume (almost nonexistent waveforms) presents the music piece she used. She faded it in and out to create negative space and lengthen her sentence, a strategy that provoked suspense for her audience.

Figure 3. Screenshot of the combination of image, audio track, and text



4.4.2. Fanny’s case

By choosing a PowerPoint slideshow as her medium and selecting only specific design elements, Fanny engaged in transformation and transduction processes that were subtler and overlapping in her project. Her use of L1 and L2 to address her audience, her translation of the captions, and her image choices presented more complex engagement in the design process.

Fanny decided to use written captions to illustrate her story. However, she used both languages unevenly based on the message she conveyed and her target audience. At the beginning of her project (Slides 2 and 3), she stated, “Toute ma vie j’ai eu la famille et les amis qui m’ont supporté dans tous mes efforts. Je n’ai jamais été traité [sic] différemment parce que j’avais un bras [sic] [All my life,

I have had family and friends who supported me in all of my endeavors. I was never treated differently because I had one arm]”. Whereas the translation is pulled from the storyboard, these two slides appeared exclusively in French in both modes, textual and oral, in Fanny’s final project. She did not use English captions. Moreover, her statement is strong and frames her story. She carefully selected the French definite articles *la* and *les* in “J’ai eu la famille et les amis”, excluding anyone who is not part of friends or family, and told her audience that she had not missed out on anything in her life: “Je n’ai jamais été traité [sic] différemment”.

Yet, from Slides 4 to 6, she added English captions and used French only for the voiceover. To address the English audience, she started her story with a statement of uncertainty: “Sometimes I wondered if my parents knew that I had one arm” and illustrated both slides with a collage of pictures portraying herself with specific family members: her parents and grandparents. At this point, she spoke not only to an English audience, but a specific one: her family. She included them after presenting herself to the French audience, stating that she had what she needed and rejecting any compassion or judgment from them. Starting her story at different slides based on a specific audience underscored how she constructed meanings through the use of L1 and L2.

Moreover, from the proposal to the final version, she changed the title of her story from “One arm wonder” to “Ma vie [my life]”, a more general title that addressed both the L1 and L2 audiences and encompassed anyone who would like to listen to her story. More importantly, she talked to her family and shared a more intimate story. Although Fanny’s goal in her prequestionnaire was to give “a chance for the audience to be enlightened to a change in perspective”, the findings highlighted layers of meanings developed in the arrangement of modes.

Furthermore, while at the beginning she firmly stated to the French audience that she had never been treated differently (Slide 3), she confessed later (Slide 6) to both audiences: “when I was young, I never imagined that people would treat me differently... As I grew older, I experienced many people who thought differently”. This slide introduced a series of events in which she

faced people who only saw her as a disabled person. She narrated these events in Slides 7, 8, 9, and 10, in which she displayed images and captions in both French and English. Fanny did not embed a voiceover in any of these four slides.

Findings revealed that Fanny had never provided Slides 7 and 8 as she turned in the different steps of her project. She added them in her final version. Without a postinterview, I could not explain the participant's choice to add these pieces to her story. Since she did not receive feedback on these oral parts, I could only suppose that Fanny did not embed them because of her lack of confidence in her speaking skills. Thus, she avoided recording them on her own, and instead, put captions in both languages.

Nevertheless, I believe that Fanny's decision was deliberate and carefully thought out. First, she chose to present all events without a voiceover even though she had recorded and received feedback for Slides 9 and 10. Then, she provided captions in the same order, French first and English second. Finally, she differentiated each language with a different color, red for French and green for English, and used this differentiation throughout the entire project.


Moreover, toward the end, Fanny continued to play with captions in French and/or English. Slides 11, 13, and 14 provide English captions, while Slide 12 does not. Slides 15, 16, and 20 present both languages. Slides 17 and 18 have English captions only, and Slide 19 is presented exclusively in French. At first glance, her choices are uneven and seem random, but an in-depth examination of how Fanny orchestrated elements of design revealed careful attention to detail and engagement in the design process. These disparities that emerged between and within modes point out meaningful decisions in her use of L1 and/or L2 based on (1) the audience(s) she targeted, (2) the message she conveyed and how she expressed it, and (3) the confidence she had with her own language proficiency.

Finally, the transduction process is particularly relevant in Fanny's selection of visual and linguistic elements. Two examples (Slides 7 and 8), in which

Fanny recounted two events, propose to examine how she constructed layers of meaning and developed agency.

Both experiences occurred during a trip to Australia in which she participated with a group of students. In Slide 7, she explained that she was not allowed to hold a koala, while other students did receive permission. Despite a detailed narration, she focused the audience's attention on one single picture to bring more meaning to her words (Figure 4).

Figure 4. Representation of Fanny's Slide 7



Quand les gens n'avaient pas la foi en moi, j'ai dû me rappeler avoir la foi en moi-même. Cette image a été prise quand j'étais en Australie. On a permis à tout le monde de tenir le koala, mais pas à moi.

J'ai dû essayer difficilement de ne pas pleurer dans cette image. Bien que j'aie voulu tenir le koala et je savais que je pourrais, j'ai donné au gardien de koala ma paix parce qu'il n'a simplement pas compris.

Il protégeait seulement le koala. Que je le comprenne.

When people did not believe in me, I had to remember to believe in my self. This picture was taken when I was in Australia on a student ambassador trip. All of the students were allowed to hold the koala but not me.

I had to try my hardest not to cry in this picture. I wanted to hold the koala and I knew that I could, I gave the koala keeper my peace because he simply did not understand.

He was only protecting the koala. That I understand that.

Every picture that Fanny chose throughout her DST portrayed her smiling and happy. Yet, for this particular moment, she informed her audience that she was frustrated. She was torn between the koala keeper's intention to keep the animal safe and her desire to prove her ability to hold the animal safely. According to the way she phrased it in both languages, her decision to not argue with the koala keeper showed her inner strength.


"I had to try my hardest not to cry in this picture. I wanted to hold the koala and I knew that I could, I gave the koala keeper my peace because

he simply did not understand. He was only protecting the koala. That I understand that”.

In providing this afterthought, she maintained a positive attitude, avoiding blaming anyone who did not understand her, and preventing her audience from feeling uncomfortable or targeted. The adverbs ‘simply’ and ‘only’ and the redundancy of ‘that’ underscored self-reflection and her acceptance of the situation. Nonetheless, the disparity between her words “I had to try my hardest not to cry in this picture” and the picture displaying her smiling, encouraged the audience to think about the emotions she could feel as a disabled person. Through her words, she shared her feelings, while the visual showed the opposite. She smiled when posing for the photo; nevertheless, in her story, she meant to warn her audience about the ways people could act toward disabled people and the lack of understanding they could potentially demonstrate.

In the second example, Slide 8 (Figure 5), the concept of transduction occurred within the translation from L1 to L2. In the slide, she was describing outdoor activities such as zip-lining, surfing, and scuba diving in which she participated with her group and the coaches’ attitude when giving safety instructions.

Figure 5. Representation of Fanny’s Slide 8



J'ai eu beaucoup de batailles avec moi-même. Avant que les photos de moi, le surf et la plongée sous-marine a été prise, Les instructeurs hésitaient à me laisser participer et m'a demandé plus d'une fois « Êtes-vous sûre que vous pouvez le faire ? » Leurs visages exprimaient un certain scepticisme et de la pitié.

Et ensuite bien sûr, cette petite voix dans ma tête est venue disant quelque chose comme : « Ouais ratée, va t'asseoir ! Pour qui te prends-tu ? » Mais au lieu d'écouter cette voix, je l'ai fait taire et j'ai continué à vivre ma vie.

Before the photos of me zip lining, surfing, and scuba diving were taken, the instructors were hesitant about letting me participate. They asked me several times questions like, "Are you sure you can do it?" "Have you done anything like this before?" Their faces expressed complete skepticism, pity, and extreme doubt.

And of course, that little voice in the back of my head came saying phrases similar to, "Yeah go sit down, who are you kidding?" But instead of listening to that voice I silenced it and continued to live my life.

During the narration, she decided to use a mini-dialogue happening between herself and her inner voice: “cette petite voix dans ma tête est venue disant quelque chose comme ‘ouais ratée, va t’asseoir! Pour qui te prends-tu?’ [that little voice in the back of my head came saying phrases similar to, ‘Yeah go sit down, who are you kidding?’]”.

This dialogue, created when working on her project, never happened in real life, and her intention was merely to provide an example of how she was interpreting the coaches’ thoughts about her disability. “They asked me several times questions like, ‘Are you sure you can do it, have you done anything like this before?’ Their faces expressed complete skepticism, pity, and extreme doubt”. Her words “complete skepticism”, “pity”, and “extreme doubt” are striking, and by using all of them in one sentence, Fanny seemed to concentrate on the many feelings that she had seen in others’ perceptions. They accentuated her disability and diminished her humanity. For the first time, she exposed some anger and frustration through the use of the “little voice”.

Moreover, the expressions that Fanny used to make her inner voice speak were much more provocative in French than in English. She employed a familiar language register by saying, “ouais ratée” [yeah, failure] that she did not use in English. Also, she used the form “tu” which in the French context conveys familiarity between two interlocutors. She also used the imperative mode and an exclamation mark to communicate her perception of the coaches’ command. Finally, the question “Pour qui te prends-tu?” is usually employed to recognize someone’s inappropriate behavior in a given situation, or someone who is exceeding their rights.

By using these expressions in L2, Fanny demonstrated her ability to nuance what she would like to communicate in French and her native tongue. The French version seemed more bitter and heartless than the English version. Fanny may have deliberately softened her English version because of the broader or more intimate audience she anticipated to reach. Knowing that the French audience would only be restricted to her instructor and her classmates, who might not notice the differences as language learners, Fanny may have intended

to (1) show some language proficiency by using some familiar expressions that she had learned during her semester abroad; and/or (2) express deeper feelings with no consideration toward the audience's (mainly my) reaction. Nonetheless, she developed her voice in her L2 as she made linguistic choices on how to share this particular event with her L2 audience, creating different feelings between the L1 and L2 messages.

5. Discussion

In this study, I did not analyze language proficiency and instead examined the use of the target language with equal attention to other semiotic resources. The study suggests that students made intentional language and semiotic choices to construct meanings and express opinions.

Maïze realized that sharing her point of view could be difficult in French despite her high proficiency. To mitigate challenges, she committed to work on diverse linguistic designs, including intonation, personal pronouns, and present tense. She chose to make short and well-structured sentences that she used as a pattern. Her vocabulary choices were selective and precise, which allowed her to sharpen her intonation and to emphasize specific words by stretching them out and orchestrating them with her visuals. She took the time to select music that supported her voiceover intonation and intertwined them. In addition, she shot her videos, choosing particular camera angles and movements. She stepped into the role of a director by interacting with people, explaining her project, deciding upon the setting, and directing them as actors. She used all the spatial and gestural design elements available to her and created new ones to design meanings.

Fanny used all the digital features required by the instructions, but her story was primarily based upon the writing and speaking portions. She carefully chose her words in both languages and worked on her intonation. She used informal discourse in which the French expressions were provocative and incisive. Whereas she selected the linguistic mode as the main design element,

she carefully chose her pictures and thoughtfully displayed them to illustrate her narration, mixing slides with collage and slides with single photos as a focal point. She demonstrated her understanding of how the visual aspect of her storytelling embellished and supported her story and directed the way she represented herself.

As this study suggests, creating DS allows students to combine old and new literacies (Sylvester & Greenidge, 2009), which impact their language development (Hur & Suh, 2012). Through the creation of digital stories, students “articulate a complete, coherent story with a beginning, middle, and end in the target language using multiple media and multiple modalities” (Castañeda, 2013, p. 57). The benefits of integrating DS in FL classrooms relate to language production and practices. According to Smeda, Dakich, and Sharda (2014), digital narratives give students the opportunity to select and concentrate on the language modality(ies) they want to improve. They can also focus on specific tasks, such as structuring complete sentences, pronouncing high-level vocabulary, spelling words, and practicing intonation (Hur & Suh, 2012; Kim, 2014; Ramírez Verdugo & Alonso Belmonte, 2007; Smeda et al., 2014). Digital stories enhance language modalities that allow students to contextualize and construct their stories through the use of linguistic structures and visual and audio aids. As Darwin and Norton (2014) pointed out, “[w]hile some learners can be particularly skillful in crafting a story through words, others may be good at choosing images, finding the right music, matching the different elements, and using the digital tools” (p. 62).

6. Conclusion and implication for FL education

Today’s necessity to integrate new literacy approaches (Cope & Kalantzis, 2015; Kern, 2015; Paesani, Allen, & Dupuy, 2016) into FL curricula to promote 21st century skills is clear and should not be overlooked by schools, administrators, and teachers. However, such curricular changes cannot be realized without urgently addressing the needs of FL teachers through quality professional development opportunities. Researchers have reported that teachers’ lack of

preparation, awareness, and familiarity with the ways a multimodal text works in its interplay between modes and meaning-making constructions prevents them from integrating and teaching multimodal literacy in their classrooms (Chandler, 2017).

Thus, through the lens of DS, this study illustrates the implementation of the multiliteracies pedagogy in an FL course and can serve as a potential model for FL teachers. DS is a tool that serves multiple teaching objectives and fosters numerous language modalities and learning strategies. Podkalicka and Campbell (2010) suggested that digital stories are more valuable to the process of learning than the final product itself. In developing personalized learning experiences (Smeda et al., 2014), DS invites students to become more aware of their language needs and skills and become proficient in technical aspects. In various studies (Robin, 2008; Smeda et al., 2014; VanderArk & Schneider, 2012, as mentioned in Smeda et al., 2014), teachers have reported that the ‘learning by doing’ approach fosters students’ self-confidence to ask questions, participate in discussions, and express opinions.

Moreover, working with digital literacies increases students’ motivation (Kim, 2014) and collaboration (Castañeda, 2013; Smeda et al., 2014), and helps them to remain engaged throughout the project (Sylvester & Greenidge, 2009). However, teachers who consider integrating digital stories into their curriculum must have clear goals and objectives. They need to know the reasons behind such a project, their expectations, and what they want to assess. They must be trained and prepared to support students’ needs to achieve 21st century skills.

Future studies should take into account how a more extended period (i.e. several semesters) could impact students’ performance, and consider students’ level of language proficiency to understand how the learning process affects their semiotic awareness. In addition, future projects using DS could integrate into the curriculum (1) the editing phase to facilitate the creation process, and (2) a participative platform where students could post their productions, watch and comment on others’ stories, and be involved in “real-world processes of language use” (Ollivier, 2018, p. 36), reaching communities beyond the FL classrooms.

References

- Alismail, H. A. (2015). Integrate digital storytelling in education. *Journal of Education and Practice*, 6(9), 126-129.
- Anderson, J., Chung, Y. C., & Macleroy, V. (2018). Creative and critical approaches to language learning and digital technology: findings from a multilingual digital storytelling project. *Language and Education*, 32(3), 195-211. <https://doi.org/10.1080/09500782.2018.1430151>
- Bezemer, J., & Jewitt, C. (2009). Social semiotics. In J.-O. Östman, J. Verschueren & E. Versluys (Eds), *Handbook of pragmatics* (vol. 13, pp. 1-14). John Benjamins. <https://doi.org/10.1075/hop.13.soc5>
- Blyth, C. (2014). Exploring the affordances of digital social reading for L2 literacy: the case of eComma. *Digital literacies in foreign and second language education*, 12, 201-226.
- Bryant, A., & Charmaz, K. (2007). (Eds). *The Sage handbook of grounded theory*. Sage. <https://doi.org/10.4135/9781848607941>
- Burgess, J. (2006). Hearing ordinary voices: cultural studies, vernacular creativity and digital storytelling. *Continuum: Journal of Media & Cultural Studies*, 20(2), 201-214. <https://doi.org/10.1080/10304310600641737>
- Castañeda, M. E. (2013). "I am proud that I did it and it's a piece of me": digital storytelling in the foreign language classroom. *CALICO Journal*, 30(1), 44-62. <https://doi.org/10.11139/cj.30.1.44-62>
- Chandler, P. D. (2017). To what extent are teachers well prepared to teach multimodal authoring? *Cogent Education*, 4(1), 1266820. <https://doi.org/10.1080/2331186x.2016.1266820>
- Cope, B., & Kalantzis, M. (2009). "Multiliteracies": new literacies, new learning. *Pedagogies: An International Journal*, 4(3), 164-195. <https://doi.org/10.1080/15544800903076044>
- Cope, B., & Kalantzis, M. (2015). (Eds). *A pedagogy of multiliteracies: learning by design*. Palgrave Macmillan.
- Darvin, R., & Norton, B. (2014). Transnational identity and migrant language learners: the promise of digital storytelling. *Education Matters: The Journal of Teaching and Learning*, 2(1), 55-66.
- Gee, J. P. (2008). Learning in semiotic domains. *Literacies, Global and Local*, 2, 137-149.
- Hur, J. W., & Suh, S. (2012). Making learning active with interactive whiteboards, podcasts, and digital storytelling in ELL classrooms. *Computers in the Schools*, 29(4), 320-338. <https://doi.org/10.1080/07380569.2012.734275>

- Jewitt, C. (2009). (Ed.). *The Routledge handbook of multimodal analysis* (pp. 28-39). Routledge.
- Jiang, L. (2017). The affordances of digital multimodal composing for EFL learning. *ELT Journal*, 71(4), 413-422. <https://doi.org/10.1093/elt/ccw098>
- Kern, R. (2000). *Literacy and language teaching*. Oxford University Press.
- Kern, R. (2006). Perspectives on technology in learning and teaching languages. *TESOL Quarterly*, 40(1), 183-210. <https://doi.org/10.2307/40264516>
- Kern, R. (2015). *Language, literacy, and technology*. Cambridge University Press.
- Kim, S. (2014). Developing autonomous learning for oral proficiency using digital storytelling. *Language Learning & Technology*, 18(2), 20-35.
- Kress, G. (2003). *Literacy in the new media age*. Routledge.
- Kress, G. (2009). *Multimodality: a social semiotic approach to contemporary communication*. Routledge.
- Kress, G., & van Leeuwen, T. (1996). Narrative representations: designing social action. In G. Kress & T. van Leeuwen (Eds), *Reading images: the grammar of visual design* (pp. 45-73). Routledge. <https://doi.org/10.1075/fol.3.2.15vel>
- Lambert, J. (2002). *Digital storytelling: capturing lives, creating community*. Digital Diner.
- Lambert, J. (2013). *Digital storytelling: capturing lives, creating community* (4th ed.). Routledge.
- Lebrun, M., Lacelle, N., & Boutin, J.-F. (2012). Genèse et essor du concept de littératie médiatique multimodale. *Mémoires du livre / Studies in Book Culture*, 3(2), 1-19. <https://doi.org/10.7202/1009351ar>
- Lemke, J. L. (1998). Metamedia literacy: transforming meanings and media. In D. Reinking, M. C. McKenna, L. D. Labbo & R. D. Kieffer (Eds), *Handbook of literacy and technology: transformations in a post-typographic world* (pp. 283-301). Erlbaum.
- Lundby, K. (2008). Editorial: mediatized stories: mediation perspectives on digital storytelling. *New Media & Society*, 10(3), 363-371. <https://doi.org/10.1177/1461444808089413>
- Lynch, T. (2007). Learning from the transcripts of an oral communication task. *ELT Journal*, 61(4), 311-320. <https://doi.org/10.1093/elt/ccm050>
- Michelson, K., & Dupuy, B. (2014). Multi-storied lives: global simulation as an approach to developing multiliteracies in an intermediate French course. *L2 Journal*, 6(1), 21-49. <https://doi.org/10.5070/l26119613>
- Miller, E. A. (2009). *Digital storytelling, in department of curriculum and instruction*. University of Iowa.

- Nelson, M. (2006). Mode, meaning, and synaesthesia in multimedia L2 writing. *Language Learning & Technology*, 10(2), 56-76.
- Nelson, M. E., & Kern, R. (2012). Language teaching and learning in the postlinguistic condition. In L. Asalgoff, S. L. McKay, G. Hu & W. A. Renandya (Eds), *Principles and practices for teaching English as an international language* (pp. 47-66). Routledge.
- New London Group. (1996). A pedagogy of multiliteracies: designing social futures. *Harvard Educational Review*, 66(1), 60-92. <https://doi.org/10.17763/haer.66.1.17370n67v22j160u>
- Ollivier, C. (2018). Towards a socio-interactional approach to foster autonomy in language learners and users. eLANG project-Digital literacy for the teaching and learning of language. Graz, Austria: European Center for Modern Languages. https://www.ecml.at/Portals/1/documents/ECML-resources/elang-EN-A5_28112018_112721.pdf?ver=2018-11-28-112721-473
- Oskoz, A., & Elola, I. (2016). Digital stories: overview. *Calico Journal*, 33(2), 157-173. <https://doi.org/10.1558/cj.v33i2.29295>
- Paesani, K. W., Allen, H. W., Dupuy, B., (2016). *A multiliteracies framework for collegiate foreign language teaching*. Prentice Hall.
- Paulus, T. M. (1999). The effect of peer and teacher feedback on student writing. *Journal of Second Language Writing*, 8(3), 265-289. [https://doi.org/10.1016/s1060-3743\(99\)80117-9](https://doi.org/10.1016/s1060-3743(99)80117-9)
- Podkalicka, A., & Campbell, C. (2010, June). Understanding digital storytelling: individual 'voice' and community-building in youth media programs. *Seminar: Net: Media, Technology & Life-Long Learning*, 6(2), 1-10.
- Ramírez Verdugo, D., & Alonso Belmonte, I. (2007). Using digital stories to improve listening comprehension with Spanish young learners of English. *Language Learning & Technology*, 11(1), 87- 101.
- Reinhardt, J., Warner, C., & Lange, K. (2014). Digital games as practices and texts: new literacies and genres in an L2 German classroom. *Digital literacies in foreign and second language education*, 12, 159-177.
- Reinhardt, J., & Zander, V. (2011). Social networking in an intensive English program classroom: a language socialization perspective. *Calico Journal*, 28(2), 326-344. <https://doi.org/10.11139/cj.28.2.326-344>
- Robin, B. (2006). The educational uses of digital storytelling. *Technology and Teacher Education Annual*, 1, 709-716.
- Robin, B.R. (2008). Digital storytelling: a powerful technology tool for the 21st century classroom. *Theory Into Practice*, 47(3), 220-228. <https://doi.org/10.1080/00405840802153916>

- Smeda, N., Dakich, E., & Sharda, N. (2014). The effectiveness of digital storytelling in the classrooms: a comprehensive study. *Smart Learning Environments*, 1(1), 1-21. <https://doi.org/10.1186/s40561-014-0006-3>
- Sylvester, R., & Greenidge, W. L. (2009). Digital storytelling: extending the potential for struggling writers. *The Reading Teacher*, 63(4), 284-295. <https://doi.org/10.1598/rt.63.4.3>
- Unsworth, L. (2001). *Teaching multiliteracies across the curriculum. Changing contexts of text and image in classroom practice*. Open University Press.
- Van Gils, F. (2005, June). Potential applications of digital storytelling in education. In *3rd twente student conference on IT* (Vol. 7). University of Twente, Faculty of Electrical Engineering, Mathematics and Computer Science Enschede.
- VanderArk, T., & Schneider, C. (2012). *How digital learning contributes to deeper learning*. Getting Smart. http://www.worldwideworkshop.com/pdfs/GettingSmart_DigitalLearningDeeperLearning.pdf
- Vinogradova, P., Linville, H. A., & Bickel, B. (2011). "Listen to my story and you will know me": digital stories as student-centered collaborative projects. *TESOL Journal*, 2(2), 173-202. <https://doi.org/10.5054/tj.2011.250380>
- Volle, L. M. (2005). Analyzing oral skills in voice e-mail and online interviews. *Language Learning and Technology*, 9(3), 146-163.
- Yang, Y. F. D. (2012). Multimodal composing in digital storytelling. *Computers and Composition*, 29(3), 221-238. <https://doi.org/10.1016/j.compcom.2012.07.001>



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